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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/187,551	11/05/98	MUSAKA K	AM524R1/T289

IM52/0612

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EXAMINER	
PADGETT, M	
ART UNIT	**PAPER NUMBER**
1762	18

DATE MAILED: 06/12/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
09/187,551	
Examiner	**Group Art Unit**
M.L. Padgett	1762

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on 3/5/01.

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-10, 27-29 + 31-34 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-10, 27-29 + 31-34 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)–(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)–(d).

☐ All ☐ Some* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Attachment(s)

☐ Information Disclosure Statement(s), PTO–1449, Paper No(s). _____

☐ Interview Summary, PTO–413

☐ Notice of Reference(s) Cited, PTO–892

☐ Notice of Informal Patent Application, PTO–152

☐ Notice of Draftsperson's Patent Drawing Review, PTO–948

☐ Other _____

Office Action Summary

1. In accordance with 37 CFR 1.175(b)(1), a supplemental reissue oath/declaration under 37 CFR 1.175(b)(1) must be received before this reissue application can be allowed.

Claims 1-10, 27-29 and 31-34 are rejected as being based upon a defective declaration under 35 U.S.C. 251. See 37 CFR 1.175. The nature of the defect is set forth above.

Receipt of an appropriate supplemental oath/declaration under 37 CFR 1.175(b)(1) will overcome this rejection under 35 U.S.C. 251. An example of acceptable language to be used in the supplemental oath/declaration is as follows:

> "Every error in the patent which was corrected in the present reissue application, and is not covered by a prior oath/declaration submitted in this application, arose without any deceptive intention on the part of the applicant."

2. The original patent, or an affidavit or declaration as to loss or inaccessibility of the original patent, must be received before this reissue application can be allowed. See 37 CFR 1.178.

3. The declaration (3/5/01) by Mr. Musaka appears to identify the negative stresses of Fig. 13 as being compressive and formed at <450 sccm, while the claimed tensile stress are said to be the positive values, and >450 sccm for C_2F_6, which in Fig. 10 corresponds to [F] of about 8% Atomic or greater, thus if one can take the declaration as supplying definitions for claim 27, the recapture issue would be said to be over come. However, the specification as written still lacks support in its text and explanation of the figures, and actually contradicts the declaration as it states in col. 6, lines 43-45 that the

positive value of $1x10^9$ dynes/cm^2 is compressive stress. One cannot overcome a problem by saying one thing in a declaration and essentially the opposite in the specification.

4. Claims 27-29 and 31-33 are rejected under 35 U.S.C. 251 as being an improper recapture of claimed subject matter deliberately canceled in the application for the patent upon which the present reissue is based. As stated in *Ball Corp.* v. *United States*, 221 USPQ 289, 295 (Fed. Cir. 1984):

> The recapture rule bars the patentee from acquiring, through reissue, claims that are of the same or broader scope than those claims that were canceled from the original application.

In order to make the claims allowable over the prior art in parent application 08/259,584, the specific halogen F, as well as the specific type of fluorine source, CX_4 or CX_3-$(CX_2)_n$-CX_3 were added to the claims as well as the minimum concentration of F in the deposited silicon oxide. The new claims introduced in the reissue broaden the scope of the claims to include all types of halogens from any source and do not require a minimum [F]. Furthermore, while the new claims, as exemplified by claims 27, relate the deposition of a layer deposited from gases comprising Si, O and halogen to "a desired stress" or "a tensile stress", this stress and the concentration of fluorine are inherently related, as can be seen in applicant's graphs (Figs. 9-13) or in Homma (EPO 517,548 or USPN 5,288,578) in col. 4 of the EPO reference, hence removing the concentration and source limitations is recapture. That applicant is stating an effect caused by the [F] previously claimed, is essentially paraphrasing in order to broaden the claims, i.e., recapture of previously excluded laminations or conditions.

To restate the issue, controlling the stress is intimately related to controlling the F concentration, hence to claim stress with no clearly defined metes and bounds, or even starting at -1.25×10^9 dynes/cm^2 in essence recaptures [F] that were excluded by limitations in the patented claims, as can be easily seen by comparing values in Figs. 10 and 13.

As was pointed out in the advisory, applicant's arguments concerning the various stresses ARE NOT supported by their specification as written, nor has any prior art been supplied to support their arguments and allegations. Applicant has newly (3/5/01) submitted a declaration by Mr. Musaka, identifies the negative stresses in Fig. 13 as being compressive, and the positive as being tensile, but the specification contradicts this, so cannot remove this rejection at this time. Note that changing teachings in the specification to conform with the declaration, to exclude or otherwise modify those teachings already present may introduce new matter issues.

Note that claim 34 dependent on 33 contain the limitations of the patented claims that have been deleted from the new independent claims. Claims 28-29 and 32-33 which replace part, but not all the recaptured limitations are insufficient to remove them from this rejection.

5. Claims 27-34 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added claims still contain new

matter and lack support as written, although Mr. Musaka's declaration almost provides support to correct this problem, but is inconsistent with some teachings of the specification. Specifically in claim 27, the claim of generic layer deposition, "a tensile stress instead of a compressive stress" and is not supported by the original specification language. In the matter of "intrinsic stress", the only mention of this term is found in the background (co. 3, line 35), when discussing prior art, not the present invention. Col. 6, lines 40-45, discuss $1x10^9$ dynes/cm^2 as compressive stress, seemingly contradicting applicant's comments on tensile stress values on page 5 of the response of 12/22/99 plus the declaration of Mr. Musaka. When discussing the inventive process in the specification, all terms involving stress either have no modifier (Fig. 13; col. 4, lines 46-49, and col. 9, lines 28-30) or are "compressive" (col. 6, lines 43-45; col. 8 lines 23-25 and 66; col. 9, line 6), which would imply that all are compressive if any particular kind of stress must be named. For these reasons, the claims contain New Matter. In applicants' response of 12/22/99, they cited fig. 13 for showing their comparison of stresses, and discuss which values are which, however the specification does NOT support their allegations as written. While further discussion of stresses is present in the 6/16/00 response, it still consists of unsubstantiated allegations with unclear (if any) relationships to the original specification. Note the claims of tensile stress less than $0.4x10^9$ dynes/cm^2, while applicants' page 5 response of 12/22/99 states that at a 600 sccm C_2F_6 flow, the stress becomes tensile stress at about this same value. Mr. Musaka's declaration provides

450 sccm as the transition point, while the compressive stress identified on col. 6 of the patent disagree with the declaration apparent definition of the term compressive stress. These various and seemingly contradictory statements on the record, need to be reconciled to clarify this issue, as well as consistent with the specification.

Claims 27-33 are rejected under 35 U.S.C. 251 as being based upon new matter added to the patent for which reissue is sought. The added material which is not supported by the prior patent is as discussed above.

6. The disclosure is objected to because of the following informalities: Applicant's graph in Fig. 13 and discussion thereof (as well as Fig. 3 to SN 08/691,983 in Novak et al) have negative stress values, that lacking and CLEAR prior art supported explanation or the like, appear to be scientifically questionable. If applicant's have a noncontradicting explanation for this, please supply a prior art reference or other supported means to clarify the issue, otherwise it appears that either there are other errors in the specification (see above identified contradictions), or the values should not be negative but just down an order to magnitude, otherwise the scales do not make sense because $0x10^9=0$, giving a discontinuity not properly explained by the specification nor properly illustrated by the graph, i.e. an incredibly broad jump from $0.5x10^9$ to-$0.5x10^9$. So are values really going from $+0.5x10^9$ dyne/cm^2 to - $1.25x10^9$ dyne/cm^2 (Musaka et al Fig. 13), or is this an artifact from somebody's attempt to simplify the numbering on the axis? In the other application that appears to have provided the original claim language as

previously discussed (the specification lacking any prior art supported explanation or the like), Figs. 3 and 4 appear equally questionable, having positive and negative values all to the power of 10^9 and in dyne/cm^2. While the examiners has at times suspected that values that would make more sense are 0 is 0.1, .5 is 0.05, 1.0, etc., but see NO enablement for this in the specification and the present set of explanations have added confusion to the record. The examiner also wonders if Fig. 9 is accurately labeled (hence is claim 9 correct?), because saying the decreasing of the ratio of F in the reactant, increases the atomic %F deposited is scientifically questionable. Commonly seen values for internal stress for F-containing SiO_2 deposits, from plasma and other CVD depositions are noted with 2x 10^8 dyne/cm^2 (See Homma's 5,288,518; col. 3, line 42-45) being exemplary, and probably related in some fashion to what applicant's values are intended to represent.

Appropriate correction is required.

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CAR 1.321© may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CAR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CAR 3.73(b).

8. Claims 1-10 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 29-33, 38-40 and 42-45 of copending Application No. 08/888,499. Although the conflicting claims are not identical, they are not patentably distinct from each other because of reasons stated in paper No. 4, section 8. Applicant's stated intent to file the terminal disclaimer remains noted (page 4 of 12/22/99 response), and is still awaited.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 27-28 and 31 are rejected under 35 U.S.C. 102(b) or (e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Homma EP0 517,548A2 or USPN 5,288,518).

Homma teaches the formation of fluorine-containing silicon oxide films where the internal stress is $2x10^8$ dynes/cm^2 (which is less than $4x10^8$) and the dielectric constant is about 3.7. Several methods of deposition are taught including plasma CVD via a parallel plate reactor and using reaction gases of 0_2, TEOS and FSi $(OCH_2 H_5)_3$, called fluorotriethyloxysilane, but could also be called triethylfluorosilicate, so abbreviation could be FTEOS, FTES or TEFS. Homma uses flow controllers, bubblers and nitrogen gas to introduce the reactant gases into the reaction chamber, hence the flow rates are selected and controlled, so for the conditions used, it is seen that the film properties produced are known, i.e., predetermined. See Fig. 3 and col. 4 lines 8-57 in the EPO reference which is a statutory bar. The U.S. Patent has like teachings, but is the (e) reference. Note the uncertainty over what applicants mean by their stress is the only reason for the 103 aspect of the rejection, and different measurement for different stresses would have been expected to show correspondence in values due to otherwise equivalent deposition processes.

11. Claims 1-10, 27-29 and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama et al.

Nishiyama et al also teaches deposition silicon oxide containing F, where plasma CVD, including duel frequency or high density plasma, are used (summary, esp. col. 2, lines 30-60 and col. 3, lines 31-56 and 66-col. 4, line 6). Explicit teachings that [F] in the SiO_2 film "can be easily controlled by controlling the flow rate of the source gas" (col. 3, lines 53-56), with example 1 (col. 5-7) teaching reactant gases of TEOS + O_2 + NF_3 where NF_3 flow rates of 50 sccm, 100 sccm, 150 sccm and 200 sccm produced atomic % of about 2, 3, 4 and 5, respectively (col. 6, lines 36-50). Col. 7 provided alternate F-source teachings of CF_4, ClF_3, SiF_4 and $FSi(OC_2H_5)_3$, and discussion of other reactant combinations also showing flow rate dependence for [F] deposited. As dopant concentration of fluorine in the silicon oxide deposit of Homma would have been expected to effect the stress level as discussed above, as well as the dielectric constant which Nishiyama also discusses, it would have been obvious to one of ordinary skill in the art that as flow rate of the F-source has been shown by Nishiyama et al to be related to the amount of fluorine deposited, then controlling and adjusting flow rate in order to maintain or produce desired film properties dependent on the [F], such as the dielectric constant or the stress, would have been expected to be an effective and efficient way to produce consistent and desired results.

While Nishiyama et al does not include CF_3H or other fluorocarbon containing hydrogen in the non-exclusive list of other possible fluorine sources, these compounds are analogous or homologous to the CF_4 explicitly taught, hence would have been obvious to

one of ordinary skill in the art as useful alternatives, because they would have been expected to have analogous chemistry and to produce the same trend for [F]/stress effects, using routing experimentation to determine their desirable flow parameter, etc. No advantages were found in applicant's specification for using partially hydrogenerated fluorocarbons and excluding perfluoronated ones, all presented measurements used C_2F_6, which is now excluded from claims 1-10 or 33-34.

It was noted in the parent case's reasons for allowance that Nishiyama et al was differentiated over by the allowed claims in P.N. 5,571,571, because of the use of different precursor materials, however a closer reading of Example 1 (discussed above) showed that the TEOS + 0_2 + NF_3 reactant gases where explicitly taught to have effective alternatives for the taught and claimed deposition, with CF_4, a previously claimed fluorocarbon being specifically suggested as an alternative for NF_3, and various atomic % ranging from 2-5% suggested to be deposited dependent on flow rate. The more general teaching on col. 2, lines 53-54 also suggest NF_3, CF_4 and C_2F_6 alternately as other F-sources, hence it would have been abundantly obvious to one of ordinary skill in the art to substitute the claimed fluorocarbon compounds for NF_3 in the Nishiyama teaching to produce films by processes as claimed. Also note in col. 6, lines 12-25 of example 1, Al wiring, i.e. spaced conductive lines, were formed on the substrate prior to the claimed and taught deposition. Any useful line width would have been expected to be used.

Nishiyama et al's example 6 teaches dual frequency plasma deposition with frequencies as claimed, but a different set of reactant gases ($FSi(OC_2H_5)_3+0_2$), however in example 1 on col. 7, lines 22-34, theses gases we explicitly taught as possible alternatives to the TEOS + NF_3 combination, hence are of ordinary skill in the art would have expected the alternative duel frequency plasma apparatus to be effective with any of the taught gas combinations, hence obvious to use therewith.

Note example 1, gives TEOS flow rates as 50 sccm and NF_3 as 0-500 sccm, depending on layer and trial. As NF_3 has three F, 50 sccm to 0-500 sccm gives 1:(0-30)=14:14(0-30) ratio of Si:F which is inclusive of about 14:1, although from Nishiyama et al's teaching one would expect greater amounts of F to produce larger atom% F in the deposit, while applicant's Fig. 9 appears to be saying just the opposite, i.e., that as the ratio of Si to F increases (i.e., F present in reactants with respect to Si) that atomic % F actually goes in the opposite direction (increases), but it is questionable whether this was actually what was meant, since decreasing the fluorine source does not usually increase the amount of it deposited unless some other parameters is significantly changed. (See comment in section 6).

12. Claims 27-29 and 31-34 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 29-33, 38-40 and 42-45 of copending Application No. 08/888,499 in view of Nishiyama et al, for reasons as stated in the action of paper No. 4.

This is a provisional obviousness-type double patenting rejection.

13. Claims 27-29 and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the PCT reference WO 92/20888 to Weise.

Weise teaches the use of halogen enchants, such as CF_4, C_2F_6, SiF_4, etc., (page 9 and 15) to reduce the defects and amount of hydrogen present as hydroxyl in silicon oxide films deposited by methods inclusive of PECVD (pages 10, 11 and 12), using organosilicons, such as TEOS (pages 9 and 13), where the intrinsic stress of the deposit is thereby reduced from what it otherwise would have been. This process is controlled by adjusting the ratios of the gases introduced (pages 10 and 15). As the etchant (halogen gas) is taught to directly effect the intrinsic stress, choice of reactant ratio as taught is equivalent to predetermining the stress level due to the inter-relationship. While Weise does not discuss selecting the rate at which the etchant halogen source is introduce, the parameters of flow rate and reactant ratio are inherently related, such that it would have been obvious to one of ordinary skill in the art that in order to control the ratio of reactants, one must select, i.e., control their flows. Neither are H-containing fluorocarbons taught, but the obviousness of that difference discussed above in section 11, apples equally here.

14. Applicant's arguments filed 3/05/01 and discussed above have been fully considered but they are not persuasive.

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication should be directed to M. L. Padgett at telephone number (703) 308-2336 on Monday--Friday from about 8:00 a.m. to 4:30 p.m,. and FAX (703) 305-3599 (official); and 305-6078 (unofficial).

M.L. Padgett/dh

June 7, 2001

June 12, 2001

MARIANNE PADGETT
PRIMARY EXAMINER
GROUP 1700